UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CANADA
DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH

WATER RESOURCES REVIEW for SEPTEMBER 1976

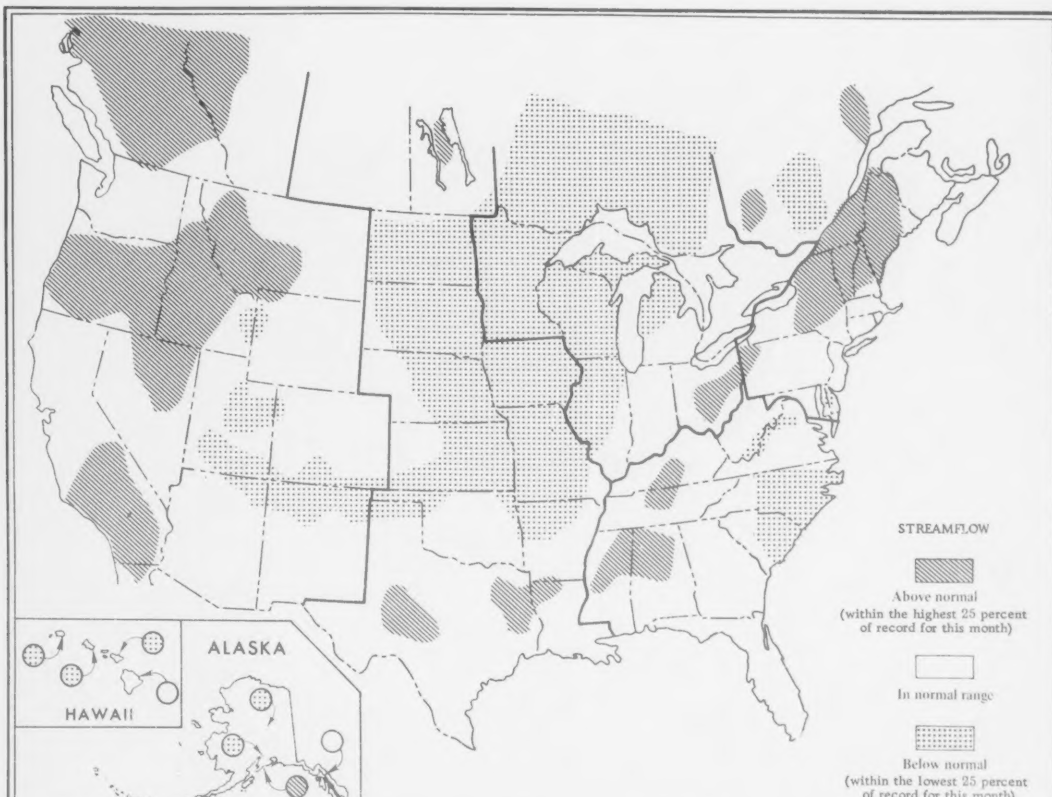
STREAMFLOW AND GROUND–WATER CONDITIONS

Streamflow generally decreased seasonally in southern Canada and in most areas of the United States but increased in some southern and western States.

Flows remained in the below-normal range in the northern part of the Midcontinent region and adjacent parts of the Western Great Lakes region, as well as in several southeastern and southwestern States and also Alaska and Hawaii. Flows remained above the normal range in large areas of the Northeast and Northwest and in several southern States.

Monthly and daily mean flows were lowest of record in parts of Alaska, Iowa, Maryland, Michigan, and South Dakota.

Flooding occurred in Alaska and California. Most of the flooding in southern California resulted from rains associated with hurricane Kathleen.



CONTENTS:

NORTHEAST

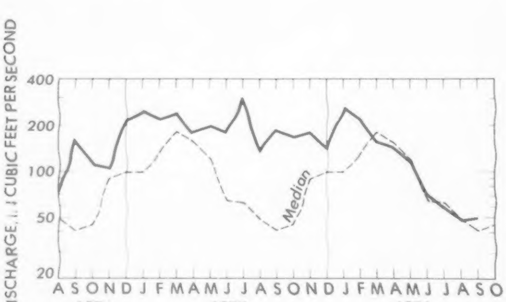
[Atlantic Provinces and Quebec; Delaware, Maryland, New York, New Jersey, Pennsylvania, and the New England States]

Streamflow generally decreased seasonally except in parts of Quebec and Nova Scotia. Flows remained in the above-normal range in central and northern parts of the region. Monthly mean discharge decreased into the below-normal range in central Quebec. Record-low monthly mean discharges occurred in Maryland.

In the northern part of the region, monthly mean discharges in Maine decreased seasonally at all index stations, were 2 to 3 times the September median flows, and were above the normal range. In central Quebec, the monthly mean discharge of St. Maurice River at Grand Mere decreased contraseasonally and was below the normal range. In the southern part of the Province, south of the St. Lawrence River, monthly mean flow of St. Francois River at Hemmings Falls decreased but remained in the above-normal range for the 3d consecutive month.

In Vermont and the adjacent areas of New Hampshire and New York, monthly mean flows remained in the above-normal range as a result of high carryover flows from August and generally were about twice the September median flows.

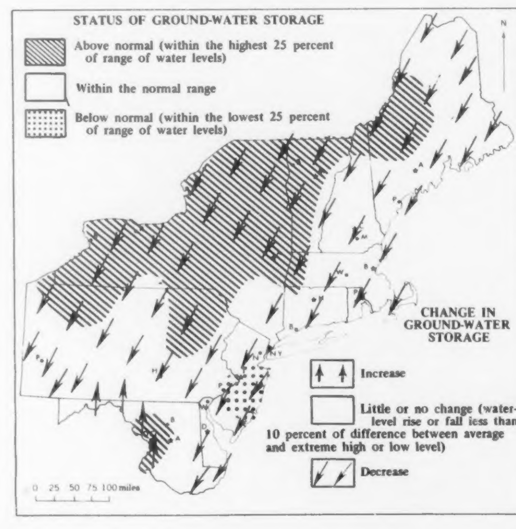
Monthly mean flows decreased seasonally in Pennsylvania and New Jersey and were generally in the normal range. At the index station, South Branch Raritan River near High Bridge, New Jersey, streamflow decreased for the 8th consecutive month but remained in the normal range. (See graph.)



Monthly mean discharge of South Branch Raritan River near High Bridge, N.J. (Drainage area, 65.3 sq mi; 169.1 sq km)

In eastern Maryland, the monthly mean discharge of 10.1 cfs at the index station, Choptank River near Greensboro (drainage area, 113 square miles) was lowest for the month since records began in January 1948.

Ground-water levels declined in most of the region. (See map.) The principal exception was an area of rising levels in west-central Maryland. Monthend levels remained above average in most of New York State and parts of adjacent States as well as in northern New Hampshire, adjacent western Maine, and also in part of west-central Maryland. Elsewhere, levels were generally near average for the end of September.



Map shows ground-water storage near end of September and change in ground-water storage from end of August to end of September.

SOUTHEAST

[Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia]

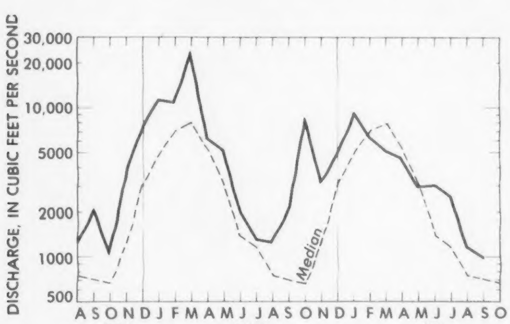
Streamflow generally decreased seasonally throughout the region and remained in the below-normal range in parts of Virginia, North Carolina, and South Carolina and decreased into that range in part of West Virginia. Flows increased into the above-normal range in parts of Mississippi, Alabama, Tennessee, and Kentucky.

In eastern West Virginia, where the mean discharge of Greenbrier River at Alderson (drainage area, 1,357 square miles) during August was less than median but in the normal range, flow in September continued to decrease seasonally, was only 41 percent of median, and in the below-normal range. Similarly, in northern Virginia, monthly mean discharge in Rapidan River near Culpeper decreased to less than 40 percent of median and into the below-normal range.

In north-central North Carolina, mean flow of Neuse River near Clayton (drainage area, 1,140 square miles) was about 50 percent of median and in the below-normal range for the 3d consecutive month. At the index station, Cape Fear River at William O. Huske Lock near Tarheel, where mean discharge during August was in the below-normal range and less than one-third median, flow continued to decrease seasonally with the monthly mean about one-third median for September.

In South Carolina, monthly mean discharge of Pee Dee River at Peedee remained in the below-normal range for the second consecutive month, and in the adjacent basin of Lynches River, monthly mean flow at the index station at Effingham decreased into that range and was only 58 percent of the median flow for September.

In Tennessee, monthly mean flow at Harpeth River near Kingston Springs increased contraseasonally into the above-normal range and was 2.5 times the median flow as a result of scattered thunderstorms. In south-central Tennessee, where mean discharge of Duck River above Hurricane Mills during June, July, and August was nearly two times the median, streamflow decreased seasonally and was in the normal range.(See graph.)



Monthly mean discharge of Duck River above Hurricane Mills, Tenn. (Drainage area, 2,557 sq mi; 6,623 sq km)

In northwestern Alabama and the adjacent parts of northeastern Mississippi, monthly mean flows at the index stations increased to over 2 times the median flows for September and were in the above-normal range. In central Kentucky, flow at the index station, Green River at Munfordville (drainage area, 1,673 square miles) decreased seasonally but was in the above-normal range.

Ground-water levels generally declined. However, levels rose in a few southeastern and extreme western counties of West Virginia, as well as in coastal North Carolina and in northeastern Florida. In southern Florida, levels rose slightly in the lower Everglades in Palm Beach County. Levels rose also in the heavily pumped Savannah area of coastal Georgia, but declined or changed only slightly in the heavily pumped Brunswick area to the south. Monthend levels were above average in the mountains of western North Carolina and in the southern one-third of West Virginia. They were generally below average elsewhere in West Virginia and North Carolina, as well as in the Piedmont of central Georgia. Levels were near or below average in southeastern Florida. In central Mississippi, in the Jackson metropolitan area, the rather sharply declining levels that had occurred in the Sparta Sand since early spring continued well into September and then leveled off slightly, probably as a result of decreased pumping for irrigation and cooling; levels rose in a few wells. Along the Gulf Coast of Mississippi, levels were lowest of record in some of the wells screened in the Pascagoula and Graham Ferry Formations. In Kentucky, in the Ohio River valley, levels continued to rise in glacial outwash sand and gravel in parts of the Louisville area, and were at or near the highest levels in 30 years of record in some observation wells. The persistent rising trend and the unusually high levels result from a combination of factors of recent months and years, including reductions in industrial use of ground water, increasing construction of septic tanks in adjacent suburban areas, replacement of some private wells by expanding areal coverage by the public-supply system, and above-normal precipitation.

WESTERN GREAT LAKES REGION

[Ontario; Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin]

Streamflow generally decreased seasonally throughout the region but increased in parts of Ohio, Ontario, and Minnesota. Flows remained below the normal range in the northern part of the region and decreased into that range in part of Michigan's Lower Peninsula. Monthly mean flows were lowest of record in parts of Michigan and Wisconsin.

In Michigan's Upper Peninsula, record low monthly and daily mean discharges for any month occurred for the second consecutive month at the index station, Sturgeon River at Sidnaw (drainage area, 171 square miles). The September monthly mean discharge of 4.26 cfs and the daily mean of 2.0 cfs on September 13 were the lowest in 36 years of record at Sidnaw. In the northern part of Michigan's Lower Peninsula, streamflow decreased contraseasonally at the index station, Muskegon River at Evart, into the below-normal range. Monthly mean discharge at Evart had been in the normal range or above the normal range since April 1972.

(Continued on page 5.)

SELECTED DATA FOR THE GREAT LAKES, GREAT SALT LAKE, AND OTHER HYDROLOGIC SITES

GREAT LAKES LEVELS

Water levels are expressed as elevations in feet above International Great Lakes Datum 1955

(Data furnished by National Ocean Survey, NOAA, via U.S. Army Corps of Engineers office in Detroit. To convert data to elevations above mean sea level datum of 1929, add the following values: Superior, 0.96; Michigan-Huron, 1.20; St. Clair, 1.24; Erie, 157; Ontario, 1.22.)

Lake	September 30, 1976	Monthly mean, September		September		
		1976	1975	Average 1900–75	Maximum (year)	Minimum (year)
Superior (Marquette, Mich.)	600.85	600.98	601.40	601.02	601.93 (1916)	599.46 (1926)
Michigan and Huron (Harbor Beach, Mich.)	579.60	579.85	580.25	578.47	580.76 (1952)	575.94 (1964)
St. Clair (St. Clair Shores, Mich.)	575.00	575.12	575.53	573.51	575.70 (1973)	571.36 (1934)
Erie (Cleveland, Ohio)	572.00	572.13	572.45	570.44	572.51 (1973)	568.23 (1934)
Ontario (Oswego, N.Y.)	245.25	245.54	244.65	244.70	246.91 (1947)	241.94 (1934)

GREAT SALT LAKE

Alltime high: 4,211.6 (1873). Alltime low: 4,191.35 (October 1963).	September 30, 1976	September 30, 1975	Reference period 1904–75		
			September average, 1904–75	September maximum (year)	September minimum (year)
Elevation in feet above mean sea level:	4,200.40	4,199.95	4,197.6	4,203.7 (1923)	4,191.50 (1963)

LAKE CHAMPLAIN, AT ROUSES POINT, N.Y.

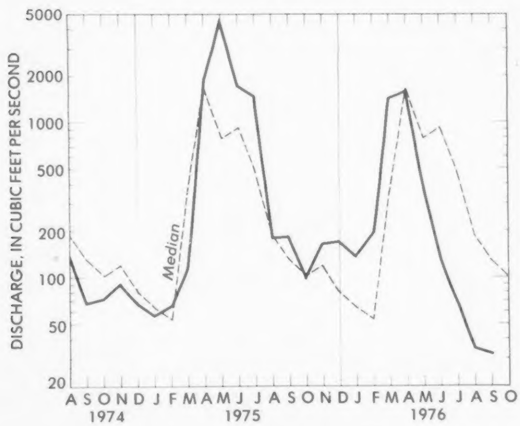
Alltime high (1827–1975): 102.1 (1869). Alltime low (1863–1975): 92.17 (1941).	September 30, 1976	September 30, 1975	Reference period 1939–75		
			September average, 1939–75	September max. daily (year)	September min. daily (year)
Elevation in feet above mean sea level:	96.57	95.49	94.54	96.75 (1972)	92.91 (1941)

FLORIDA

Site	September 1976		August 1976	September 1975
	Discharge, in cfs	Percent of normal	Discharge in cfs	Discharge in cfs
Silver Springs near Ocala (northern Florida)	790	83	730	650
Miami Canal at Miami (southeastern Florida)	291	80	223	250
Tamiami Canal outlets, 40-mile bend to Monroe	861	168	395	531

(Continued from page 3.)

In central Minnesota, flow of Crow River at the index station at Rockford continued to decrease seasonally, was 25 percent of median, and in the below-normal range for the 5th consecutive month. (See graph.) At other index stations in the State, monthly mean discharges were less than 20 percent of the median and in the below-normal range.



Monthly mean discharge of Crow River at Rockford, Minn. (Drainage area, 2,520 sq mi; 6,530 sq km)

Below-normal streamflow throughout Wisconsin continued to reflect the effects of drought conditions in the State. Record-low monthly mean discharges occurred at Wisconsin River at Muscoda (period of record, 62 years), Chippewa River at Chippewa Falls (period of record, 88 years), and Jump River at Sheldon (period of record, 60 years). All streamflow index stations in the State had flows in the below-normal range and were generally less than 50 percent of median.

In northern Illinois, monthly mean flow at the index station, Pecatonica River at Freeport, continued to decrease to only 50 percent of median and remained in the below-normal range for the 4th consecutive month. In the central part of the State, monthly mean flow at the index station, Sangamon River at Monticello, decreased sharply to 12.2 cfs (51 percent of median), and was in the below-normal range.

In southern Ontario, mean flows in English River at Umfreville and Missinaibi River at Mattice remained in the below-normal range for the 4th and 5th consecutive months, respectively.

In eastern Ohio, flow of Little Beaver Creek near East Liverpool increased contraseasonally as a result of runoff from rains near midmonth and the monthly mean flow was 3 times median. In central Ohio, monthly mean discharge at Scioto River at Higby decreased seasonally but remained in the above-normal range for the 3rd consecutive month.

Ground-water levels continued to decline in most of the region, but slight rises were noted in northern Minnesota and central Ohio. Below-average levels were noted over most of the region except in Ohio, where they were in the normal range. In Michigan, levels were below average in the western part of the Upper Peninsula, but were near or above average in most areas elsewhere in the State. Below-average levels prevailed in Indiana and Wisconsin. In Minnesota, ground-water levels rose in shallow water-table aquifers but remained below average in the northern half of the State, and declined and remained below average in the southern half. For the third consecutive month, the level in the shallow observation well at Hanska in south-central Minnesota was at a new low in 32 years of record. In the heavily-pumped artesian aquifers of the Minneapolis-St. Paul area in Minnesota, artesian levels rose sharply in wells tapping the Prairie du Chien-Jordan aquifer, and began to rise in the deeper Mt. Simon-Hinckley aquifer, remaining below average in both aquifers.

MIDCONTINENT

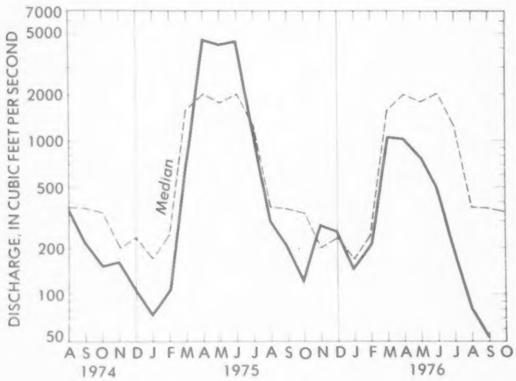
[Manitoba and Saskatchewan; Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas]

Streamflow decreased seasonally in most parts of the region but increased in western Nebraska, southern Arkansas, Texas, Oklahoma, and parts of Louisiana and Kansas. Flows remained in the below-normal range in North Dakota, South Dakota, Iowa, eastern Nebraska, eastern Kansas, and Missouri, and increased into that range in northern Arkansas. Monthly mean flows remained in the above-normal range in parts of Texas and increased into that range in parts of Manitoba and Louisiana. Record-low monthly mean discharges occurred in parts of Iowa and South Dakota.

Streamflow was unusually low in much of the central and northern parts of the region reflecting the continuing effects of a drought caused by below-average precipitation during the summer months. Monthly mean discharge of Cannonball River at Breien, North Dakota, was less than 1 percent of median and in the below-normal range. To the east, flow in Red River of the North decreased seasonally to less than 50 percent of median and into the below-normal range.

Below-normal flows persisted in South Dakota, Missouri, parts of Nebraska, Kansas, and Arkansas, and were generally less than 50 percent of median. For example, the monthly mean discharge of 37 cfs in Big Sioux River as measured at Akron, Iowa, was only 12 percent of median and record low for September.

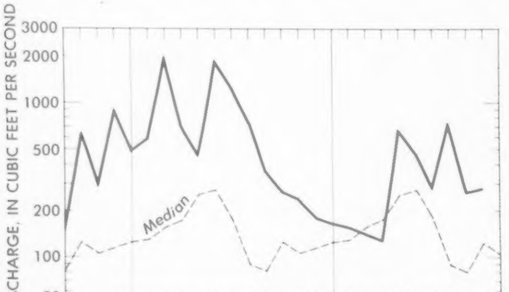
In Iowa, streamflow was below the normal range but generally lowest in the Wapsipinicon, Iowa, Des Moines, Rock, Little Sioux, and Floyd River basins. Localized thunderstorms on September 18 and 19 caused only minor rises in the streams. The monthly mean discharge of 53 cfs in Des Moines River at Fort Dodge was only 15 percent of median, in the below-normal range for the 6th consecutive month, and record low for September. (See graph.)



Monthly mean discharge of Des Moines River at Fort Dodge, Iowa (Drainage area, 4,190 sq mi; 10,852 sq km)

In northern Louisiana, flow of Saline Bayou near Lucky increased seasonally and was in the above-normal range.

In Texas, streamflow was above the normal range in the Neches, lower Pecos, and North and South Concho River basins. It was the 26th month of above-normal flows in the South Concho River basin. In south-central Texas, monthly mean discharge at the index station, Guadalupe River near Spring Branch, increased seasonally, was over 2 times the median flow for September, and in the normal range. (See graph.)



Monthly mean discharge of Guadalupe River near Spring Branch, Tex. (Drainage area, 1,315 sq mi; 3,400 sq km)

In south-central Manitoba, monthly mean discharge of Waterhen River below Waterhen Lake decreased seasonally but increased into the above-normal range. The level of Lake Winnipeg at Gimli averaged 713.42 feet above mean sea level, 0.44 foot lower than the September long-term mean, 0.51 foot lower than last month, and 2.94 feet lower than a year ago.

Ground-water levels continued to decline seasonally in the northern part of the region, but trends varied elsewhere. In North Dakota, levels continued to decline, and record lows were reached in the eastern and western observation wells. Levels also declined throughout Nebraska, and a new end-of-month low was noted for September in the shallow well near Ashland in the eastern part of the State. In eastern Iowa, the level in the well in glacial drift declined 3 feet, reaching almost to the lowest September end-of-month level of slightly more than 12 feet below land surface. Elsewhere in Iowa, levels also generally declined, and were below average except in the southern part of the State. In eastern and western Kansas, levels declined slightly; in the central part of the State they tended to remain stable. In the rice-growing area of east-central Arkansas, the water level in the shallow aquifer was unchanged; it has been in the same range since 1955. In the industrial aquifer of central and southern Arkansas – the Sparta Sand – water levels rose but remained below-average at Pine Bluff and El Dorado. Levels also rose in most major aquifers in Louisiana. Levels in the Chicot aquifer of the southwest irrigation area recovered about 15 feet since June, when pumping for rice irrigation decreased. Levels also rose in the Lake Charles industrial area. Levels in the Sparta Sand in the northern part of the State and in the "2,000-foot sand" of the Baton Rouge area were generally higher than last month. Industrial pumping lowered water levels in major aquifers in New Orleans and Alexandria; levels in the terrace aquifer around Alexandria have continued to decline since June, reflecting below-average rainfall. In Texas, levels rose and were above average in the Edwards Limestone at Austin and San Antonio, but declined and were below average in the Evangeline aquifer at Houston and in the bolson deposits at El Paso. A new September low was recorded at El Paso, and new alltime lows were recorded at Houston and in the Ogallala Formation at Plainview.

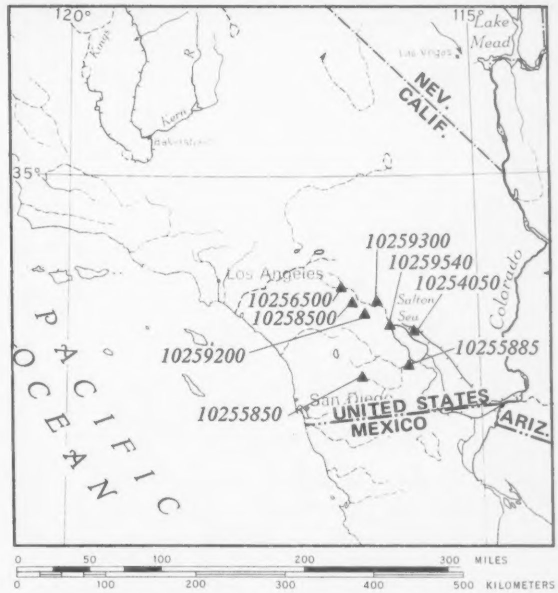
WEST

[Alberta and British Columbia; Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming]

Streamflow generally decreased seasonally in most of the region but increased in parts of California, Arizona,

Nevada, Utah, and Idaho. Flows remained in the above-normal range in parts of Alberta, British Columbia, Montana, Idaho, and Oregon and increased into that range in parts of California and Nevada. Below-normal flows persisted in parts of Utah, New Mexico, and Arizona. Flooding occurred in southern California.

Tropical storm Kathleen dumped heavy unseasonal rains in parts of San Diego, Imperial, Riverside, San Bernardino, Orange, and Los Angeles counties on September 9, 10, and 11, and caused severe flooding in southern California's desert areas. Hardest hit were the towns of Ocotillo, Brawley, and El Centro in Imperial Valley, the Coachella Valley in general and the city of Palm Desert in particular. Property damage estimated at $10 million was reported, with the floods on Dead Indian Creek and Carrizzo Creek causing most of the damage. The gaging station on San Felipe River at Westmorland was destroyed. Data on stages, discharges, and gaging station locations of selected measurement sites are given on the accompanying table and map. Monthly mean flow at the index station, Arroyo Seco near Pasadena, was over 15 times the median flow and in the above-normal range. In north-central California, where the monthly mean discharge of North Fork American River at North Fork Dam had been in the below-normal range for the previous 8 months, streamflow continued to decrease seasonally and remained below the median discharge for September but was in the normal range. (See graph on page 8.)



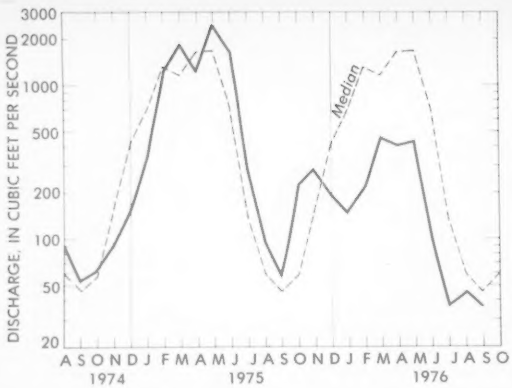
Location of stream-gaging stations in California, described in table of peak stages and discharges.

Provisional data; subject to revision

STAGES AND DISCHARGES FOR THE FLOODS ON SEPTEMBER 1976 AT SELECTED SITES IN CALIFORNIA

WRD station number	Stream and place of determination	Drainage area (square miles)	Period of known floods	Maximum flood previously known: Date	Maximum flood previously known: Stage (feet)	Maximum flood previously known: Discharge (cfs)	Maximum during present flood: Date	Maximum during present flood: Stage (feet)	Discharge: Cfs	Discharge: Cfs per square mile	Recurrence interval (years)
	SALTON SEA BASIN										
10254050	Salt Creek near Mecca . . .	269	1961–	Aug. 10, 1971	6.92	1,260	Sept. 23	14.3	[a]15,000	56	. . . .
10255850	Vallecito Creek near Julian.	39.7	1963–	July 27, 1969	5.82	434	10	7.0	[a]1,400	35	. . . .
10255885	San Felipe Creek near Westmorland.	1,693	1960–	Sept. 2, 1967	10.93	7,790	10	. . . . .	[a]40,000	24	. . . .
10256500	Snow Creek near White Water.	10.8	1959–	Jan. 25, 1969	27.4	13,000	10	6.7	3,800	352	>100
10258500	Palm Canyon Creek near Palm Springs.	93.3	1930–42 1947–	Feb. 6, 1937	5.80	3,850	10	6.8	[a]2,600	28	. . . .
10259200	Deep Creek near Palm Desert.	30.6	1962–	Nov. 23, 1965	5.15	1,300	10	9.90	7,100	232	. . . .
10259300	Whitewater River at Indio.	1,073	1938, 1966–	Mar. 2 or 3, 1938	. . . . . .	29,000	10	10.2	[a]3,000	2.8	. . . .
10259540	Whitewater River near Mecca.	1,494	1960–	Jan. 25, 1969	. . . . . .	2,500	10	10.5	[a]4,700	3.1	. . . .

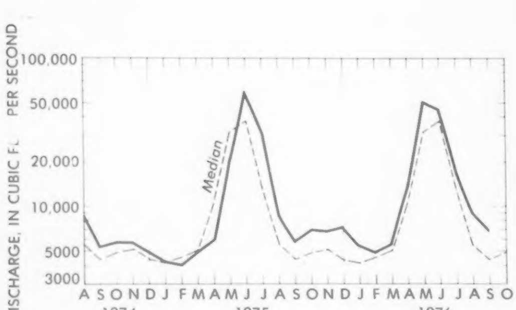
[a]Estimated.



Monthly mean discharge of North Fork American River at North Fork Dam, Calif. (Drainage area, 342 sq mi; 886 sq km)

Below-normal flows persisted in parts of Utah and New Mexico. For example, monthly mean discharge at the index station, Beaver Creek at Beaver, Utah, decreased seasonally and remained in the below-normal range for the 7th consecutive month. Similarly, monthly mean flow at the index station, Rayado Creek at Sauble Ranch, N.Mex., decreased seasonally to 2.3 cfs and remained in the below-normal range for the 2d consecutive month.

Contrasting with these low-flow conditions were the above-normal flows on many streams in Oregon, Nevada, Idaho, and Montana. Monthly mean flow at Clark Fork at St. Regis, Montana, and Yellowstone River at Billings, Montana, remained in the above-normal range, where it has been in 15 of the past 16 months and 11 of the past 12 months, respectively. In Idaho, flow at the index station, Salmon River at White Bird, decreased seasonally but remained in the above-normal range for the 2d consecutive month and above the median flow since June 1975. (See graph.)



Monthly mean discharge of Salmon River at White Bird, Idaho (Drainage area, 13,550 sq mi; 35,090 sq km)

In Alberta and British Columbia, streamflow decreased seasonally at all reporting index stations but remained in the above-normal range. For example, the monthly mean discharge of Skeena River at Usk, British Columbia (drainage area, 16,300 square miles), remained in the above-normal range for the 4th consecutive month.

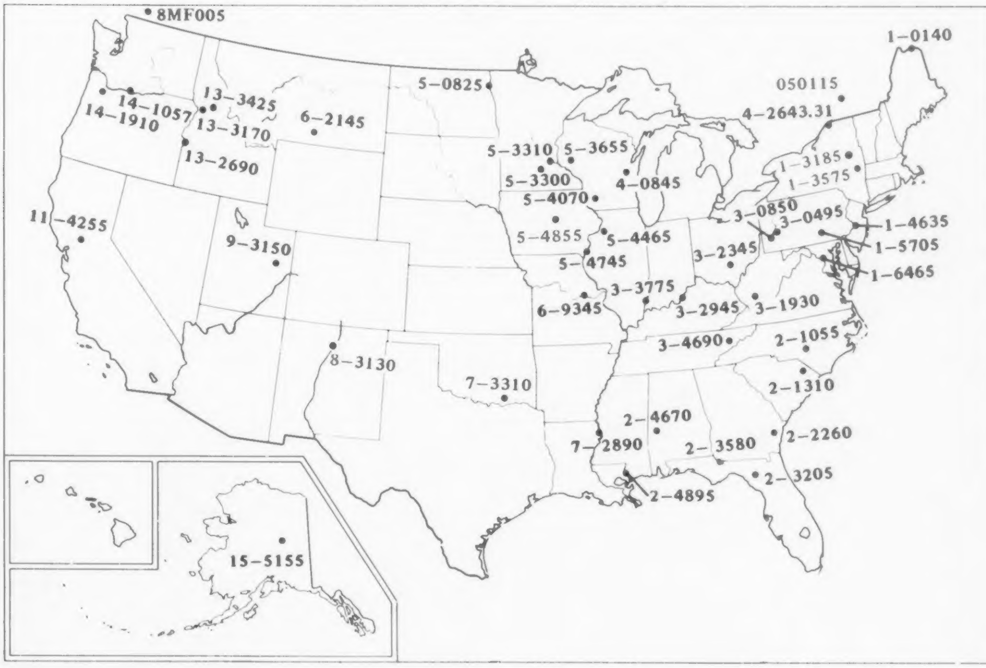
Ground-water levels generally declined in eastern and northwestern Washington, southwestern Idaho (at Meridian), and in north-central and east-central Nevada; levels declined or changed only slightly in southern Arizona. Levels rose in Utah, southeastern Idaho (at Atomic City), and in southern New Mexico except for the declining level in the key observation well in the intake area of the Roswell artesian basin. Monthend levels were above average in northwestern Washington, northern and southwestern Idaho, north-central and east-central Nevada, and in northeastern and southeastern Utah (at Logan and Blanding, respectively). Elsewhere in Utah, levels were generally below average, and were also below average in eastern Washington, southeastern Idaho (Atomic City), and southern New Mexico. In southern Arizona, levels were at alltime lows in the Elfrida (Cochise County) and Tucson No. 2 observation wells, and were lowest of record for September at the Avra Valley well. In southern California, because of heavy use of ground water, levels were below average in some observation wells despite the recharge from surface water diverted for that purpose.

ALASKA

Streamflow decreased in most of western Alaska and was in the below-normal range except for the Kenai Peninsula. Monthly mean flow at the index station, Little Susitna River near Palmer (drainage area, 61.9 square miles), was only 36 percent of median, in the below-normal range, and record low for September. In the Chena River basin, monthly mean flow as measured near Fairbanks remained in the below-normal range for the 4th consecutive month. Significant flooding occurred in Seward on the Kenai Peninsula as a result of intense rain near the end of the month. The peak discharge on Spruce Creek near Seward was highest since the flood of August 1966. Streamflow at the index station, Kenai River at Cooper Landing, was in the above-normal range and 181 percent of median.

Ground-water levels in the shallow alluvial aquifers in the Anchorage area declined sharply or remained stable during the month. Levels in wells tapping confined aquifers generally rose 1 to 3 feet during September; the only declines were recorded in the North Fork Campbell Creek fan well field.

SELECTED STREAM-GAGING STATIONS ON LARGE RIVERS



Location of stream-gaging stations on large rivers listed in table on page 12.

SELECTED DATA FOR THE MID-ATLANTIC REGION—Corrections

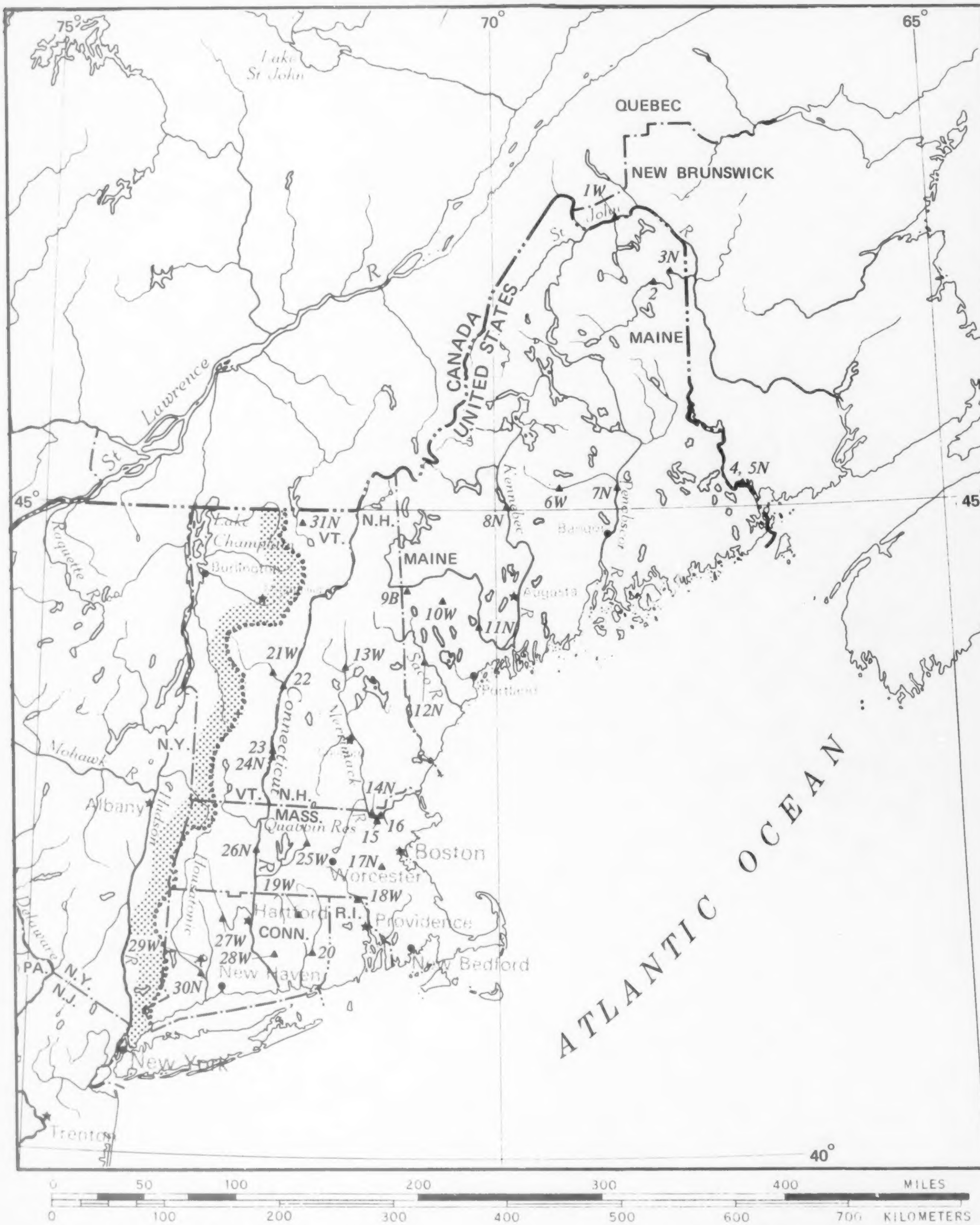
Some of the data for Mid-Atlantic Region presented on the lower table on page 13 of the August 1976 issue of the REVIEW were in error—notably, part of the statistics for the Delaware, Schuylkill, Susquehanna, and Potomac Rivers. A corrected table is shown below. The stream-gaging stations described in the table are the Hudson River at Hadley, N.Y. (3W); Mohawk River at Cohoes, N.Y. (4W); Hudson River at Green Island, N.Y.(5); Delaware River at Trenton, N.J.(13AW); Schuylkill River at Philadelphia, Pa.(15A); Susquehanna River at Marietta, Pa.(22); Potomac River near Washington, D.C.(27W); James River near Richmond, Va.(33); and Richelieu River at Fryers Rapids, at Chambly, Quebec(36).

Mean and extreme discharges at nine long-term stream-gaging stations

Number on map	Stream	Maximum discharge; month–year (cfs)	Minimum discharge; month–year (cfs)	Average discharge, 1941–70 (cfs)	Average discharge (1941–70) by months, expressed as percent of average discharge for entire 30-water-year period (percent) Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3W	Hudson	42,700/1–49	281/9–34	2,730	73	66	122	309	182	88	49	41	42	59	84	86
3W	Hudson*	....	....	2,710	71	69	113	328	179	86	48	41	39	52	83	91
4W	Mohawk	143,000/3–64	6/9–41	5,380	100	105	204	247	127	67	37	29	36	52	86	109
4W	Mohawk*	....	....	5,290	103	112	195	265	122	63	38	29	34	46	84	108
5	Hudson*	215,000/3–36	882/9–68	12,500	102	106	162	250	137	75	48	41	44	53	84	105
13AW	Delaware	329,000/8–55	1,180/10–63	11,100	107	112	178	194	130	77	58	56	45	51	89	108
15A	Schuylkill	103,000/6–72	0/at times	2,420	119	146	190	161	126	74	55	52	44	40	85	114
22	Susquehanna	1,080,000/6–72	618/9–32	35,100	109	119	219	221	151	77	39	31	26	38	75	95
27W	Potomac	484,000/3–36	121/9–66	10,100	121	153	225	176	132	78	46	47	35	49	52	89
33	James	313,000/6–72	10/66,68,70	5,820	132	165	210	165	116	65	42	57	40	49	58	103
(36)	Richelieu	43,700/6–47	1,410/8–41	10,700	72	70	105	227	195	150	87	55	46	52	67	74

*Averages shown on this line are for the period 1947–70 instead of 1941–70. Station 01358000 (site 5) was not established until February 1946.

NEW ENGLAND WATER RESOURCES REGION



The New England Region is region 1 of 21 water resources regions defined by the U.S. Water Resources Council. The regional boundary on the west, shown above as a dotted line, is along river-basin divides. The other boundaries are the State and international boundaries to the north and east, and the Atlantic Ocean to the southeast and south; Long Island, New York, is part of region 2. Region 1 has a total area of about 62,400 square miles (160,000 sq km), and includes the St. John (U.S. part), Penobscot, Kennebec, Androscoggin, Merrimack, and Connecticut (U.S. part) River basins. A corresponding map and table for region 2, Mid-Atlantic Region, appeared on pages 12 and 13 of the August issue of the Review.

SELECTED DATA FOR SOME KEY STREAM STATIONS IN THE NEW ENGLAND REGION

The stream stations listed below include, for this region, all sites presently in the National Stream Quality Accounting Network (NASQAN), the Geological Survey hydrologic bench-mark stream-gaging station; all river stations of the International Hydrological Decade (IHD, 1965–74), and all index and large-river stations that are used each month in compling the Water Resources Review. Streams are listed from northeast to southwest (except Clyde River, in northern Vermont) and in downstream order within a basin.

The map number identifies NASQAN sites by "N," the hydrologic bench-mark station by "B," and Water Resources Review stations by "W." The IHD stations are those with map numbers 7N, 8N, 11N, 16, and 26N. Of the 12 NASQAN ("N") stations, radiochemical sampling is carried out at stations 7N and 26N, and pesticide sampling at stations 3N and 14N.

Station number, name, and drainage area of 31 sites

Number on map	USGS station number	Site	Drainage area (sq mi)	Average discharge; years of record (cfs)	Within hydrologic cataloging unit--
1W	01014000	St. John River below Fish River, at Fort Kent, Maine	5,690	9,549/49	01010001
2	01017000	Aroostook River at Washburn, Maine	1,652	2,601/45	01010004
3N	01017100	Aroostook River at Caribou, Maine	1,943	....	01010004
4	01021000	St. Croix River at Baring, Maine	1,370	2,640/16	01050001
5N	01021050	St. Croix River at Milltown, Maine	1,460	....	01050001
6W	01031500	Piscataquis River near Dover-Foxcroft, Maine	297	599/73	01020004
7N	01034500	Penobscot River at West Enfield, Maine	6,670	11,730/73	01020005
8N	01046500	Kennebec River at Bingham, Maine	2,720	4,406/47	01030003
9B	01054200	Wild River at Gilead, Maine	69.5	174/11	01040002
10W	01057000	Little Androscoggin River near South Paris, Maine	76.2	138/54	01040002
11N	01059000	Androscoggin River near Auburn, Maine	3,257	6,095/47	01040002
12N	01066000	Saco River at Cornish, Maine	1,298	2,690/59	01060002
13W	01076500	Pemiqewasset River at Plymouth, N.H	622	1,348/72	01070001
14N	01096550	Merrimack River above Lowell, Mass	....	....	01070002
15	01099500	Concord River below River Meadow Brook, at Lowell, Mass	[a]405	457/39	01070005
16	01100000	Merrimack River below Concord River, at Lowell, Mass	[b]4,635	7,203/52	01070002
17N	01103500	Charles River at Charles River Village, Mass	184	296/38	01090001
18W	01111500	Branch River at Forestdale, R.I	91.2	166/35	01090003
19W	01121000	Mount Hope River near Warrenville, Conn	28.6	49.5/35	01100002
20	01127000	Quinebaug River at Jewett City, Conn	715	1,247/57	01100001
21W	01144000	White River at West Hartford, Vt	690	1,170/60	01080105
22	01144500	Connecticut River at White River Junction, Vt	4,092	7,099/64	01080104
23	01154500	Connecticut River at North Walpole, N.H	5,493	9,195/33	01080104
24N	01155050	Connecticut River at Walpole, N.H	....	....	01080104
25W	01173000	Ware River at Coldbrook, Mass	96.8	163/47	01080204
26N	01184000	Connecticut River at Thompsonville, Conn	9,661	16,270/47	01080205
27W	01188000	Burlington Brook near Burlington, Conn	4.13	8.13/44	01080207
28W	01193500	Salmon River near East Hampton, Conn	102	179/47	01080205
29W	01204000	Pomperaug River at Southbury, Conn	75.0	126/43	01100005
30N	01205500	Housatonic River at Stevenson, Conn	1,541	2,563/47	01100005
31N	04296500	Clyde River at Newport, Vt	142	255/55	01110000

[a]Total drainage area above gaging site; net area above gage is 312 sq mi; diversion as needed (for Boston metropolitan district) from remaining 92.6 sq mi.

[b]Total drainage area above gaging site; net area above gage is 4,425 sq mi; diversions as needed (for Boston metropolitan area and city of Worcester) from remaining 210 sq mi.

Mean and extreme discharges at nine long-term stream-gaging stations

Number on map	Stream	Maximum discharge; month-year (cfs)	Minimum discharge; month-year (cfs)	Average discharge; 1941–70 (cfs)	Average discharge (1941–70) by months, expressed as percent of average discharge for entire 30-water-year period (percent)											
					Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1W	St. John	148,000/5-74	510/3-48	9,140	33	24	28	242	373	114	65	50	51	61	94	63
2	Aroostook	43,100/4-73	75/2-48	2,560	42	37	46	282	329	91	53	39	45	54	106	78
7N	Penobscot	153,000/5-23	1,630/10-05	11,700	71	67	83	240	197	90	59	54	58	66	114	99
8N	Kennebec	58,800/3-36	110/12-47	4,330	84	89	95	153	198	108	77	76	78	77	82	82
11N	Androscoggin	135,000/3-36	340/9-41	6,040	74	73	109	250	192	96	56	50	54	63	97	88
16	Merrimack	173,000/3-36	199/9-23	7,150	90	99	164	266	161	85	41	34	37	46	85	96
22	Connecticut	136,000/11-27	82/8-65	6,730	68	65	123	305	186	90	47	39	42	59	94	85
26N	Connecticut	282,000/3-36	968/10-63	15,600	81	81	147	290	169	83	41	39	38	52	91	91
30N	Housatonic	75,800/10-55	(*)/....	2,440	111	117	193	213	128	82	45	47	33	45	86	101

*Practically no flow at times as a result of regulation.

Approximate drainage areas of some of the principal river basins in New England Region (from U.S. Geological Survey Water-Supply Paper 1899-I):

Penobscot River basin	8,570 sq mi (22,200 sq km)	Merrimack River basin	5,010 sq mi (13,000 sq km)
Kennebec River basin	5,970 sq mi (15,500 sq km)	Connecticut River basin	11,250 sq mi (29,100 sq km)
Androscoggin River basin	3,470 sq mi (8,990 sq km)		

FLOW OF LARGE RIVERS DURING SEPTEMBER 1976

Station number*	Stream and place of determination	Drainage area (square miles)	Mean annual discharge through September 1970 (cfs)	September 1976					
				Monthly discharge (cfs)	Percent of median monthly discharge, 1941–70	Change in discharge from previous month (percent)	Discharge near end of month		
							(cfs)	(mgd)	Date
1–0140	St. John River below Fish River at Fort Kent, Maine.	5,690	9,397	7,735	232	-61	9,400	6,100	30
1–3185	*Hudson River at Hadley, N.Y*	1,664	2,791	1,528	140	-40	2,700	1,750	30
1–3575	Mohawk River at Cohoes, N.Y	3,456	5,450	2,640	165	-27	....	....	......
1–4635	*Delaware River at Trenton, N.J*	*6,780*	*11,360*	4,308	*103*	-44	6,540	4,230	28
1–5705	Susquehanna River at Harrisburg, Pa.	24,100	33,670	10,350	176	-43	12,100	7,820	30
1–6465	Potomac River near Washington, D.C.	11,560	[1] 10,640	2,630	99	-20	1,900	1,200	30
2–1055	Cape Fear River at William O. Huske Lock near Tarheel, N.C.	4,810	4,847	673	37	-15	770	500	30
2–1310	*Pee Dee River at Peedee, S.C*	8,830	9,098	2,740	58	-9	4,380	2,830	29
2–2260	Altamaha River at Doctortown, Ga.	13,600	13,380	5,181	106	-3	4,520	2,920	24
2–3205	Suwannee River at Branford, Fla	7,740	6,775	4,610	82	-8	4,430	2,860	29
2–3580	*Apalachicola River at Chattahoochee, Fla.*	17,200	21,690	12,600	104	-9	12,000	7,800	28
2–4670	*Tombigbee River at Demopolis lock and dam near Coatopa, Ala.*	*15,400*	*21,700*	6,972	*213*	+49	2,730	1,760	28
2–4895	Pearl River near Bogalusa, La	6,630	8,533	1,948	86	-19	1,370	885	30
3–0495	*Allegheny River at Natrona, Pa*	11,410	[1] 18,700	5,687	208	-32	11,500	7,430	28
3–0850	Monongahela River at Braddock, Pa.	7,337	[1] 11,950	2,685	90	-23	4,950	3,200	28
3–1930	*Kanawha River at Kanawha Falls, W.Va.*	*8,367*	*12,370*	3,206	*100*	-11	2,540	1,640	26
3–2345	Scioto River at Higby, Ohio	5,131	4,337	1,320	219	-37	*612*	*396*	27
3–2945	Ohio River at Louisville, Ky[2]	91,170	110,600	28,800	152	-25	44,400	28,700	27
3–3775	Wabash River at Mount Carmel, Ill.	28,600	26,310	4,873	77	-29	4,300	2,800	30
3–4690	*French Broad River below Douglas Dam, Tenn.*	*4,543*	*[1] 6,528*	2,428	*91*	-8	....	....	......
4–0845	Fox River at Rapide Croche Dam, near Wrightstown, Wis.[2]	6,150	4,142	1,025	48	-26	....	....	......
02MC002 *(4–2643.31)*	St. Lawrence River at Cornwall, *Ontario–near Massena, N.Y.*[3]	299,000	239,100	309,200	128	-5	306,000	198,000	30
050115	St. Maurice River at Grand Mere, Quebec.	16,300	24,900	10,800	63	-60	16,700	10,800	27
5–0825	Red River of the North at Grand Forks, N. Dak.	30,100	2,439	653	48	-36	480	310	30
5–3300	*Minnesota River near Jordan, Minn*	*16,200*	3,306	186	17	-34	201	130	29
5–3310	Mississippi River at St. Paul, Minn	36,800	[1] 10,230	1,124	18	-1	1,310	850	28
5–3655	*Chippewa River at Chippewa Falls, Wis.*	*5,600*	*5,062*	798	26	-33	....	....	......
5–4070	Wisconsin River at Muscoda, Wis	10,300	8,457	2,611	45	-22	....	....	......
5–4465	*Rock River near Joslin, Ill*	9,520	5,288	1,730	67	-14	1,780	1,150	30
5–4745	Mississippi River at Keokuk, Iowa	119,000	61,210	15,507	38	-19	39,700	25,700	30
5–4855	*Des Moines River below Raccoon River at Des Moines, Iowa.*	9,879	*3,796*	*169*	*16*	-54	170	110	30
6–2145	Yellowstone River at Billings, Mont.	11,795	6,754	5,215	130	-39	5,900	3,800	30
6–9345	*Missouri River at Hermann, Mo*	528,200	78,480	46,300	88	-1	43,500	28,100	27
7–2890	Mississippi River at Vicksburg, Miss.[4]	1,144,500	552,700	197,500	80	-30	170,000	110,000	30
7–3310	Washita River near Durwood, Okla	7,202	1,379	304	60	+142	250	160	30
8–3130	Rio Grande at Otowi Bridge, near San Ildefonso, N.Mex.	14,300	1,530	295	60	-48	....	....	......
9–3150	Green River at Green River, Utah	40,600	6,369	1,474	64	-49	3,200	2,070	30
11–4255	Sacramento River at Verona, Calif	21,257	18,370	11,600	118	-8	9,900	6,400	28
13–2690	Snake River at Weiser, Idaho	69,200	17,670	15,450	123	+20	16,400	10,600	28
13–3170	Salmon River at White Bird, Idaho	13,550	11,060	6,659	152	-26	6,140	3,970	28
13–3425	Clearwater River at Spalding, Idaho	9,570	15,320	7,449	246	+104	11,500	7,430	28
14–1057	Columbia River at The Dalles, Oreg.[5]	237,000	194,000	163,300	155	-28	....	....	......
14–1910	Willamette River at Salem, Oreg	7,280	23,370	11,110	169	+42	9,340	6,040	28
15–5155	Tanana River at Nenana, Alaska	25,600	24,040	21,566	69	-61	16,000	10,300	30
8MF005	Fraser River at Hope, British Columbia.	78,300	95,300	159,000	192	-30	202,000	131,000	29

[1] Adjusted.
[2] Records furnished by Corps of Engineers.
[3] Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4] Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5] Discharge (unadjusted) determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.
*The U.S. station numbers as listed in this table are in a shortened form previously in use, and used here for simplicity of tabular and map presentation. The full, correct number contains 8 digits and no punctuation marks. For example, the correct form for station number 1–3185 is 01318500.

USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF SEPTEMBER 1976

[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Aug. 1976	End of Sept. 1976	End of Sept. 1975	Average for end of Sept.	Normal maximum
	Percent of normal maximum				
NORTHEAST REGION					
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	64	54	31	38	223,400 (a)
QUEBEC					
Allard (P)	90	87	84	91	280,600 ac-ft
Gouin (P)	90	86	79	102	6,954,000 ac-ft
MAINE					
Seven reservoir systems (MP)	94	83	53	56	178,500 mcf
NEW HAMPSHIRE					
First Connecticut Lake (P)	85	51	83	79	3,330 mcf
Lake Francis (FPR)	77	80	95	77	4,326 mcf
Lake Winnipesaukee (PR)	87	75	82	63	7,200 mcf
VERMONT					
Harriman (P)	72	67	78	64	5,060 mcf
Somerset (P)	80	71	92	72	2,500 mcf
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	82	75	87	74	3,394 mcf
NEW YORK					
Great Sacandaga Lake (FPR)	79	79	84	62	34,270 mcf
Indian Lake (FMP)	100	215	111	57	4,500 mcf
New York City reservoir system (MW)	90	83	91	.....	547,500 mg
NEW JERSEY					
Wanaque (M)	89	77	101	68	27,730 mg
PENNSYLVANIA					
Allegheny (FPR)	44	40	48	39	51,400 mcf
Pymatuning (FMR)	89	88	94	80	8,191 mcf
Raystown Lake (FR)	67	65	63	48	33,190 mcf
Lake Wallenpaupack (PR)	68	62	66	55	6,875 mcf
MARYLAND					
Baltimore municipal system (M)	95	93	102	86	85,340 mg
SOUTHEAST REGION					
NORTH CAROLINA					
Bridgewater (Lake James) (P)	93	90	100	82	12,580 mcf
Narrows (Badin Lake) (P)	96	97	97	98	5,617 mcf
High Rock Lake (P)	80	71	45	63	10,230 mcf
SOUTH CAROLINA					
Lake Murray (P)	87	78	79	65	70,300 mcf
Lakes Marion and Moultrie (P)	79	86	85	65	81,100 mcf
SOUTH CAROLINA--GEORGIA					
Clark Hill (FP)	75	68	78	55	75,360 mcf
GEORGIA					
Burton (PR)	91	89	88	77	104,000 ac-ft
Sinclair (MPR)	85	82	93	80	214,000 ac-ft
Lake Sidney Lanier (FMPR)	60	55	64	55	1,686,000 ac-ft
ALABAMA					
Lake Martin (P)	93	85	94	76	1,373,000 ac-ft
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	44	34	34	38	1,156,000 cfsd
Douglas Lake (FPR)	45	32	30	33	703,100 cfsd
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	78	66	53	58	510,300 cfsd
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	52	44	44	44	1,452,000 cfsd
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	72	51	46	57	745,200 cfsd
WESTERN GREAT LAKES REGION					
WISCONSIN					
Chippewa and Flambeau (PR)	69	63	73	72	15,900 mcf
Wisconsin River (21 reservoirs) (PR)	31	25	58	63	17,400 mcf
MINNESOTA					
Mississippi River headwater system (FMR)	21	14	34	32	1,640,000 ac-ft
MIDCONTINENT REGION					
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	94	92	97	.....	22,640,000 ac-ft
SOUTH DAKOTA					
Angostura (I)	65	60	60	74	127,600 ac-ft
Bell Fourche (I)	16	5	26	32	185,200 ac-ft
Lake Francis Case (FIP)	77	78	67	67	4,834,000 ac-ft
Lake Oahe (FIP)	84	81	94	.....	22,530,000 ac-ft

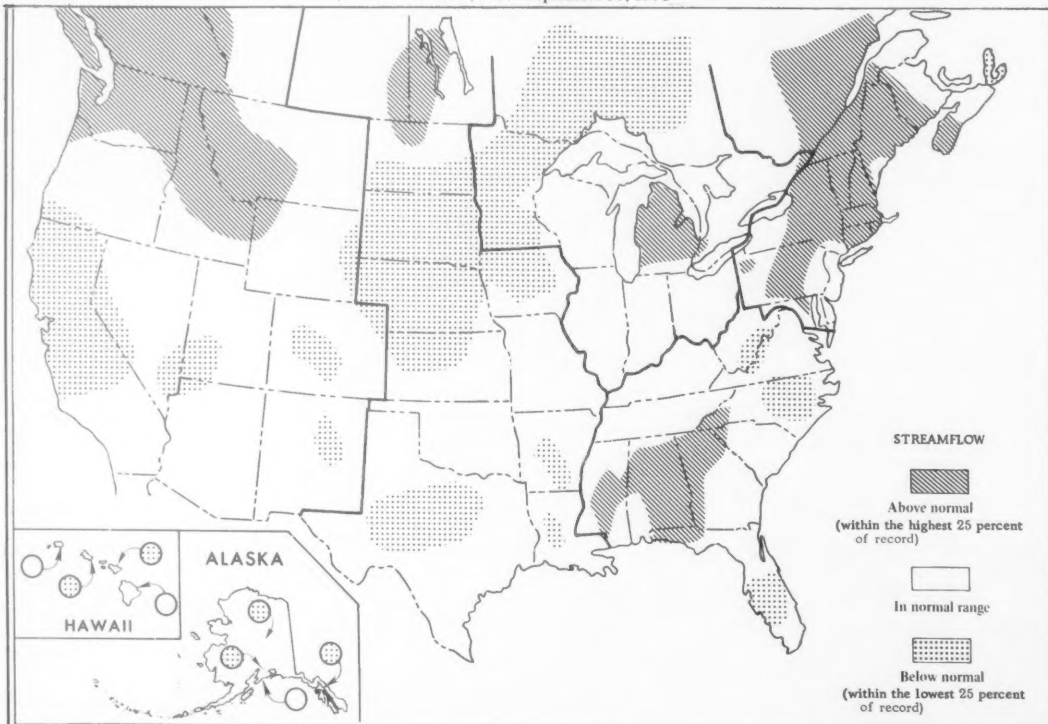
Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Aug. 1976	End of Sept. 1976	End of Sept. 1975	Average for end of Sept.	Normal maximum
	Percent of normal maximum				
MIDCONTINENT REGION—Continued					
SOUTH DAKOTA—Continued					
Lake Sharpe (FIP)	103	101	100	98	1,725,000 ac-ft
Lewis and Clarke Lake (FIP)	95	96	96	98	477,000 ac-ft
NEBRASKA					
Lake McConaughy (IP)	64	62	67	66	1,948,000 ac-ft
OKLAHOMA					
Eufaula (FPR)	79	75	89	80	2,378,000 ac-ft
Keystone (FPR)	75	69	76	99	661,000 ac-ft
Tenkiller Ferry (FPR)	93	87	107	88	628,200 ac-ft
Lake Altus (FIMR)	59	58	89	46	134,500 ac-ft
Lake O'The Cherokees (FPR)	85	77	81	81	1,492,000 ac-ft
OKLAHOMA--TEXAS					
Lake Texoma (FMPRW)	92	93	98	92	2,722,000 ac-ft
TEXAS					
Bridgeport (IMW)	84	88	99	42	386,400 ac-ft
Canyon (FMR)	93	90	90	65	385,600 ac-ft
International Amistad (FIMPW)	100	100	100	68	3,497,000 ac-ft
International Falcon (FIMPW)	93	100	89	72	2,667,000 ac-ft
Livingston (IMW)	97	100	99	73	1,788,000 ac-ft
Possum Kingdom (IMPRW)	89	96	93	102	569,400 ac-ft
Red Bluff (PI)	21	21	38	24	307,000 ac-ft
Toledo Bend (P)	90	83	85	79	4,472,000 ac-ft
Twin Buttes (FIM)	88	91	94	16	177,800 ac-ft
Lake Kemp (IMW)	61	63	84	87	268,000 ac-ft
Lake Meredith (FMW)	38	40	48	42	821,300 ac-ft
Lake Travis (FIMPRW)	94	90	91	75	1,144,000 ac-ft
THE WEST					
WASHINGTON					
Ross (PR)	99	99	98	91	1,052,000 ac-ft
Franklin D. Roosevelt Lake (IP)	97	94	95	97	5,232,000 ac-ft
Lake Chelan (PR)	99	93	90	85	676,100 ac-ft
Lake Cushman	100	95	96	91	359,500 ac-ft
Lake Merwin (P)	106	104	102	92	246,000 ac-ft
IDAHO					
Boise River (4 reservoirs) (FIP)	65	54	51	48	1,235,000 ac-ft
Coeur d'Alene Lake (P)	99	79	95	62	238,500 ac-ft
Pend Oreille Lake (FP)	99	91	87	92	1,561,000 ac-ft
IDAHO--WYOMING					
Upper Snake River (8 reservoirs) (MP)	60	54	61	48	4,401,000 ac-ft
WYOMING					
Boysen (FIP)	92	92	91	84	802,000 ac-ft
Buffalo Bill (IP)	90	77	75	81	421,300 ac-ft
Keyhole (F)	73	67	69	41	199,900 ac-ft
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	63	55	60	41	3,056,000 ac-ft
COLORADO					
John Martin (FIR)	0	0	0	14	364,400 ac-ft
Taylor Park (IR)	72	62	88	59	106,200 ac-ft
Colorado–Big Thompson project (I)	59	52	75	60	722,600 ac-ft
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Navajo, and Blue Mesa Reservoirs (IFPR)	82	80	83	.....	31,280,000 ac-ft
UTAH--IDAHO					
Bear Lake (IPR)	86	82	86	58	1,421,000 ac-ft
CALIFORNIA					
Folsom (FIP)	47	42	78	60	1,000,000 ac-ft
Hetch Hetchy (MP)	43	35	75	58	360,400 ac-ft
Isabella (FIR)	13	12	32	26	551,800 ac-ft
Pine Flat (FI)	20	20	36	35	1,014,000 ac-ft
Clair Engle Lake (Lewiston) (P)	70	62	84	78	2,438,000 ac-ft
Lake Almanor (P)	60	57	88	50	1,036,000 ac-ft
Lake Berryessa (FIMW)	67	65	87	80	1,600,000 ac-ft
Millerton Lake (FI)	38	43	32	33	503,200 ac-ft
Shasta Lake (FIPR)	31	29	82	68	4,377,000 ac-ft
CALIFORNIA--NEVADA					
Lake Tahoe (IPR)	48	42	80	56	744,600 ac-ft
NEVADA					
Rye Patch (I)	76	69	90	.....	157,200 ac-ft
ARIZONA--NEVADA					
Lake Mead and Lake Mohave (FIMP)	77	78	77	70	27,970,000 ac-ft
ARIZONA					
San Carlos (IP)	0	0	13	11	1,073,000 ac-ft
Salt and Verde River system (IMPR)	51	49	52	34	2,073,000 ac-ft
NEW MEXICO					
Conchas (FIR)	24	24	26	79	352,600 ac-ft
Elephant Butte and Caballo (FIPR)	14	13	21	22	2,539,000 ac-ft

[a]Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage)

STREAMFLOW DURING WATER YEAR 1976 (ANNUAL RUNOFF) AND NEAR END OF WATER YEAR

ANNUAL RUNOFF DURING WATER YEAR 1976

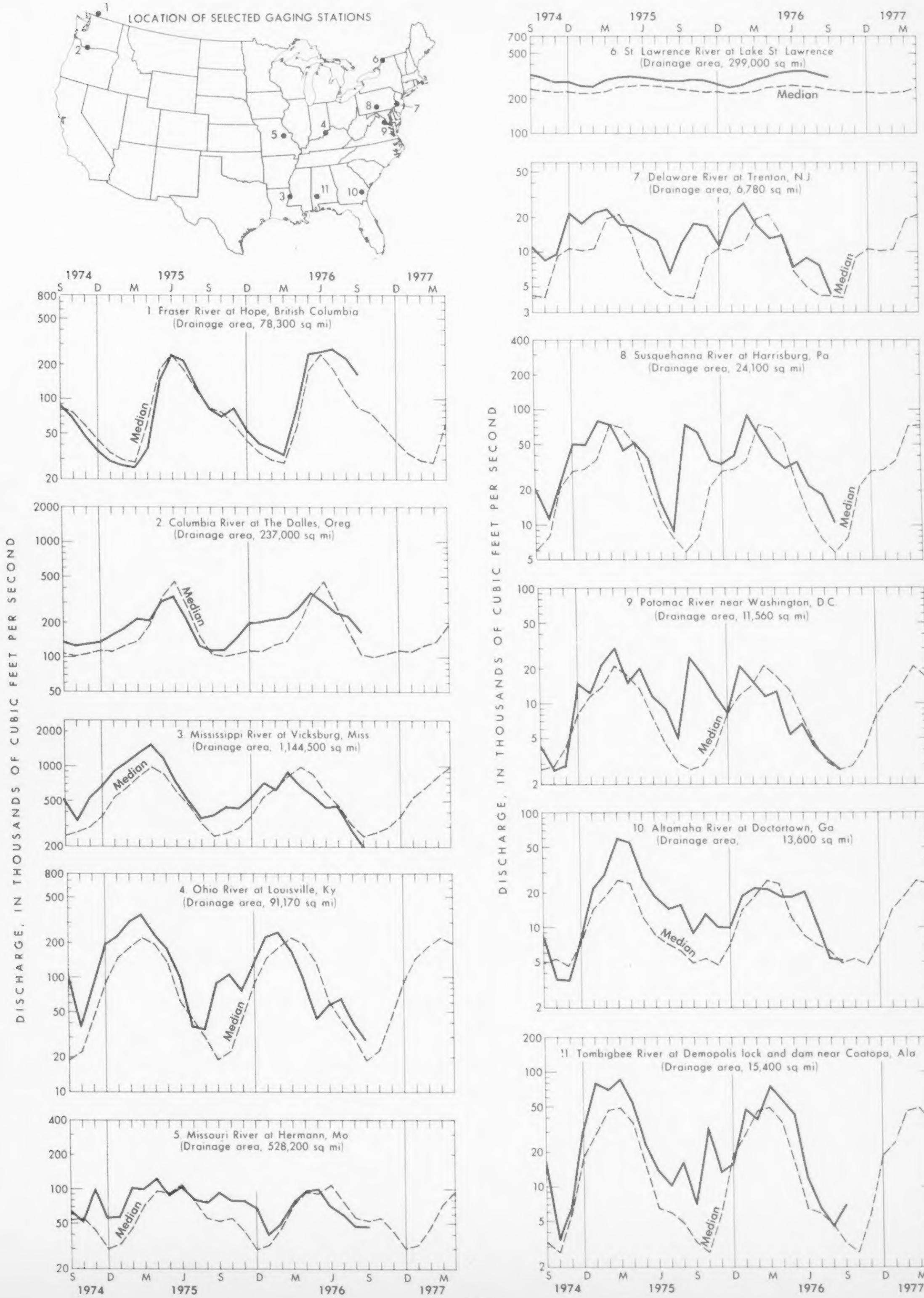
October 1, 1975–September 30, 1976



STREAMFLOW DURING SEPTEMBER 21–27, 1976*

*Streamflow compared with that occurring during the same 7 days of September of the 30-year reference period 1941–70. These 7 days of September indicate streamflow conditions near the close of the water year, ending September 30.

HYDROGRAPHS OF SOME LARGE RIVERS, SEPTEMBER 1974 TO SEPTEMBER 1976



DISSOLVED SOLIDS AND WATER TEMPERATURES FOR SEPTEMBER AT DOWNSTREAM SITES ON SIX LARGE RIVERS

Station number	Station name	September data of following calendar years	Stream discharge during month	Dissolved-solids concentration during month[a]		Dissolved-solids discharge during month[a]			Water temperature during month[b]		
			Mean (cfs)	Minimum (mg/l)	Maximum (mg/l)	Mean (tons per day)	Minimum (tons per day)	Maximum (tons per day)	Mean, in °C	Minimum, in °C	Maximum, in °C
	NORTHEAST										
01463500	Delaware River at Trenton, N.J.	1976	4,270	94	118	1,300	930	2,500	21.0	17.0	24.0
	(Morrisville, Pa.)	1945–75	5,613	71 (Sept. 21–30, 1945)	149 (Sept. 12, 1965)	......	523 (Sept. 12, 1966)	6,700 (Sept. 4, 1974)	......	14.0	32.0
			[4,176[c]]								
04264331	St. Lawrence River at	1976	309,000	166	166	139,000	136,000	142,000	19.0	18.0	20.0
	Cornwall, Ontario, near	1975	282,000	167	168	127,000	126,000	128,000	18.0	15.0	21.0
	Massena, N.Y. (streamflow station formerly at Ogdensburg, N.Y.)	1966–75	274,400 [242,000[c]]	......	......	......	......	......	20.0	15.0	24.5
	SOUTHEAST										
07289000	Mississippi River at	1976	197,500	251	266	135,000	116,000	161,000	26.0	24.5	27.5
	Vicksburg, Miss	1975	374,400 [248,200[c]]	236	272	259,000	216,000	293,000	25.5	21.0	30.0
	WESTERN GREAT LAKES REGION										
03612500	Ohio River at lock and dam 53, near Grand Chain, Ill.	1976	81,450	119	176	......	18,400	54,900	......	24.0	26.5
	(25 miles west of Paducah, Ky.; streamflow station at Metropolis, Ill.)	1955–75,	100,900 [78,480[c]]	117 (Sept. 12, 1965)	314 (Sept. 6, 1965)	......	9,190 (Sept. 17, 1961)	304,000 (Sept. 30, 1975)	......	17.0	28.5
	MIDCONTINENT										
06934500	Missouri River at Hermann,	1976	43,600	404	436	50,000	46,900	52,500	23.5	20.0	26.0
	Mo. (60 miles west of St. Louis, Mo.)	1975	92,500 [52,580[c]]	313	445	97,400	86,300	128,000	22.0	18.0	27.0
	WEST										
14128910	Columbia River at	1976	163,300	73	78	33,500	22,700	50,300	18.5	17.5	19.5
	Warrendale, Oreg.	1975	110,000	82	95	26,900	25,000	32,000	20.5	19.5	21.0
	(30 miles east of Portland, Oreg.; streamflow station at The Dalles, Oreg.)	1967–75	113,800 [105,200[c]]	......	......	......	......	......	......	15.0	21.5

[a]Dissolved-solids concentrations when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X °C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1941–70, for comparison with data for current month.

HAWAII

Streamflow was variable throughout Hawaii. In the eastern part of the State, monthly mean flow of Honopou Stream near Huelo, on the island of Maui, decreased seasonally and remained below the normal range for the 4th consecutive month. On the adjacent island of Oahu, flow at the index station, Kalihi Stream near Honolulu, increased but remained in the below-normal range. On the island of Kauai, monthly mean discharge at the index station, East Branch of North Fork Wailua River near Lihue, decreased seasonally and was in the below-normal range. Flows on the island of Hawaii were generally below median but in the normal range.

METRIC EQUIVALENTS OF UNITS USED IN THE WATER RESOURCES REVIEW

(Round-number conversions, to nearest four significant figures)

1 foot = 0.3048 meter   1 mile = 1.609 kilometers
1 acre = 0.4047 hectare = 4,047 square meters
1 square mile (sq mi) = 259 hectares = 2.59 square kilometers (sq km)
1 acre-foot (ac-ft) = 1,233 cubic meters
1 million cubic feet (mcf) = 28,320 cubic meters
1 cubic foot per second (cfs) = 0.02832 cubic meters per second = 1.699 cubic meters per minute
1 second-foot-day (cfsd) = 2,447 cubic meters
1 million gallons (mg) = 3,785 cubic meters = 3.785 million liters
1 million gallons per day (mgd) = 694.4 gallons per minute (gpm) = 2.629 cubic meters per minute = 3,785 cubic meters per day

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WATER RESOURCES REVIEW

SEPTEMBER 1976

Based on reports from the Canadian and U.S. field offices; completed October 8, 1976

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EXPLANATION OF DATA

Cover map shows generalized pattern of streamflow for September based on 22 index stream-gaging stations in Canada and 130 index stations in the United States. Alaska and Hawaii inset maps show streamflow only at the index gaging stations which are located near the points shown by the arrows.

Streamflow for September 1976 is compared with flow for September in the 30-year reference period 1931–60 or 1941–70. Streamflow is considered to be *below the normal range* if it is within the range of the low flows that have occurred 25 percent of the time (below the lower quartile) during the reference period. Flow for September is considered to be *above the normal range* if it is within the range of the high flows that have occurred 25 percent of the time (above the upper quartile).

Flow higher than the lower quartile but lower than the upper quartile is described as being *within the normal range.* In the Water Resources Review the median is obtained by ranking the 30 flows of the reference period in their order of magnitude; the highest flow is number 1, the lowest flow is number 30, and the average of the 15th and 16th highest flows is the median.

The normal is an average (but not an arithmetic average) or middle value; half of the time you would expect the September flows to be below the median and half of the time to be above the median. Shorter reference periods are used for the Alaska index stations because of the limited records available.

Statements about *ground-water levels* refer to conditions near the end of September. Water level in each key observation well is compared with average level for the end of September determined from the entire past record for that well or from a 20-year reference period, 1951–70. *Changes in ground-water levels,* unless described otherwise, are from the end of August to the end of September.

The Water Resources Review is published monthly. Special-purpose and summary issues are also published. Issues of the Review are free on application to the Water Resources Review, U.S. Geological Survey, Reston, Virginia 22092.

FLOODS OF MARCH-APRIL 1973 IN SOUTHEASTERN UNITED STATES

The accompanying map and graph are from the report, *Floods of March-April 1973 in southeastern United States,* by George W. Edelen, Jr. (USGS) and John F. Miller (NWS): U.S. Geological Survey Professional Paper 998, 283 pages, 1976; prepared jointly by the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The report may be purchased for $4.50 from Branch of Distribution, U.S. Geological Survey, 1200 S. Eads St., Arlington, VA 22202 (check or money order payable to U.S. Geological Survey); or from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402 (payable to Superintendent of Documents).

ABSTRACT

The weather system that caused major flooding in the Tennessee, Cumberland, Tombigbee, and adjacent river basins in March 1973, originated over the intermountain region of Western United States. The low system that developed moved slowly across the Great Plains. The associated cold front slowed and became almost stationary across the Southeastern States for nearly 3 days, resulting in rainfall in excess of 9 inches over much of northern Mississippi, Alabama, and central and southern Tennessee during March 14–18. Observed point 1- and 2-day rainfall amounts exceeded the 100-year recurrence interval over a large area. Some of the heaviest rains fell in areas located downstream from flood-control dams.

Floods during March-April 1973 were the greatest of record on many streams in nine major river basins in seven Southeastern States (fig. 1). The major thrust of the flood extended throughout the central part of the Tennessee River basin and into adjacent basins. Recurrence intervals of peak discharges exceeded 100 years at 28 streamflow gaging stations.

Major flooding occurred both on streams with flood-control reservoirs and on those which had none. Substantial reductions in peak stages and discharges in the Cumberland and Tennessee River basins, attained as a result of reservoir storage regulation, were reported by the U.S. Army Corps of Engineers and the Tennessee Valley Authority.

Seven lives were lost and total damage reportedly exceeded $60 million.

The report presents an analysis of the storm and rainfall distribution; summaries of flood stages and discharges (fig. 2) at 490 streamflow gaging stations, stages and contents of 45 reservoirs, flood crest stages, and hydrograph data consisting of gage height, discharge, and accumulated runoff at selected times at 92 gaging stations. The availability of aerial photographs obtained during the flood is summarized and flood damages are discussed.

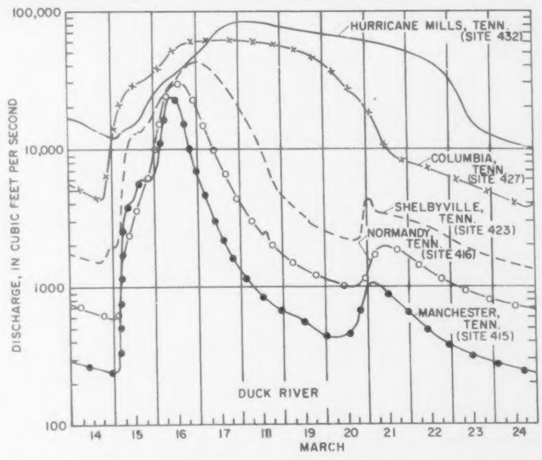

Figure 2.—Hydrographs of discharge, March 14–24, 1973, at selected gaging stations on the Duck River in Tennessee.

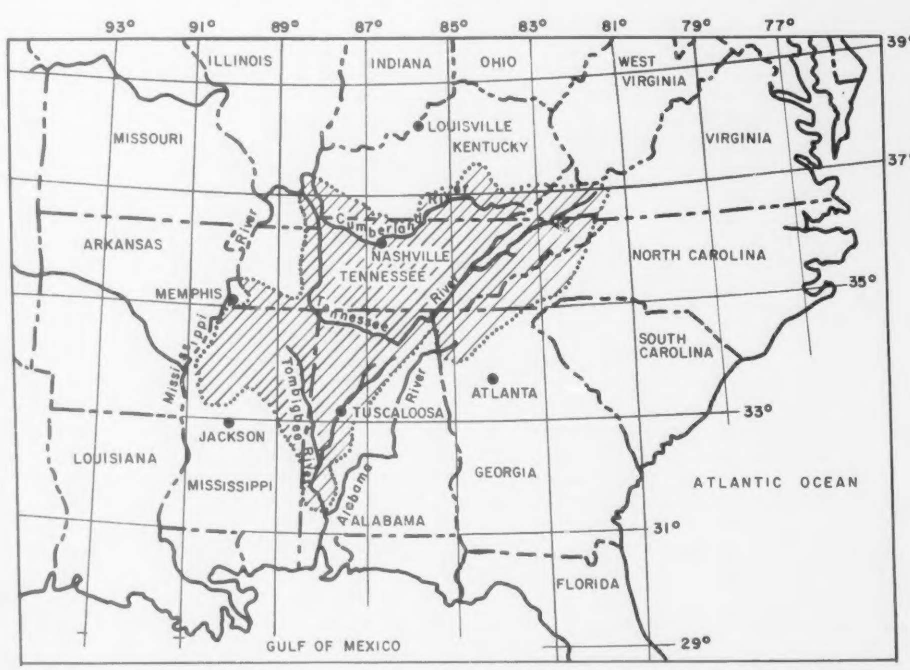

Figure 1.—Area affected by floods (shown by diagonal lines) on the Cumberland, Hatchie, Mobile, and Tennessee Rivers and their tributaries in March–April 1973. INT: 146-76